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Draft Fisheries and Aquatics Specialist Report

Little Deschutes River Restoration

Crescent Ranger District, Deschutes National Forest

DRY

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Fisheries and Aquatic Resources

This documents the review and findings of the Forest Service planned programs and activities for possible effects on species (1) listed or proposed for listing by the USDI Fish and Wildlife Service (USFWS) as Threatened or Endangered; or (2) designated by the Pacific Northwest Regional Forester as Sensitive. It is prepared in compliance with the requirements of Forest Service Manual (FSM) [2630.3](#), FSM [2672.4](#), and the Endangered Species Act of 1973, as amended (ESA) (Subpart B; 402.12, Section 7 Consultation). This section summarizes the analysis of the effects from implementing the actions proposed in this firewood cutting area on fish populations, critical habitat and habitat for threatened bull trout (*Salvelinus confluentus*), and sensitive redband trout (*Oncorhynchus mykiss*).

The following table displays the Threatened, Endangered and Sensitive (TES) species. There are no anadromous or Endangered Species Act (ESA) species or their habit within the project area.

Table 1. Threatened, Endangered and Sensitive Fish Species

Species	Scientific Name	Status	Occurrence	Effects Determination
Aquatic Species				
Columbia River Bull Trout	<i>Salvelinus confluentus</i>	T	HN	NE
Interior Redband Trout	<i>Oncorhynchus mykiss</i>	S	HD-unoccupied historic habitat	NI

Status

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act
MS	Magnuson-Stevens Act designated Essential Fish Habitat

Occurrence

HD	Habitat Documented or suspected within the project area or near enough to be impacted by project activities
HN	Habitat Not within the project area or affected by its activities
D	Species Documented in general vicinity of project activities
S	Species Suspected in general vicinity of project activities
N	Species Not documented and not suspected in general vicinity of project activities

Effects Determinations

Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Sensitive Species

NI	No Impact
MIHH	May Impact Individuals or Habitat, but Would Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species

WIFV	Would Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Location and Proposal

The U.S. Forest Service is proposing to restore aquatic and riparian habitats as well as fluvial process along a 16 km section of the Little Deschutes River. The project area is on federally managed lands bracketed by private property and the community of Crescent/Gilchrist to the north and Highway 58 on the south. Project activities would occur within and adjacent to the riparian corridor of the Little Deschutes River on the Crescent Ranger District (Map 1). The project would encompass approximately 6,286 acres of National Forest System lands.

Under this proposal, restoration activities would be implemented to restore aquatic and riparian health. Project activities would include the obliteration of an illegal water diversion, thinning/removal of lodgepole pine encroachment on the meadow/floodplain, placement of large woody material (LWM) within the active channel and floodplain, activation of disconnected flow paths, riparian planting, user created trail decommissioning and hiking/fishing trail development. Large wood and stream channel work would be accomplished with tracked, heavy equipment during the Oregon Department of Fish and Wildlife In-Water Work Period. Recruitment and placement of large woody material would be accomplished by pushing over standing trees, skidding them to the placement location and placing them in a logjam feature and the construction of beaver dam analogs (BDAs).

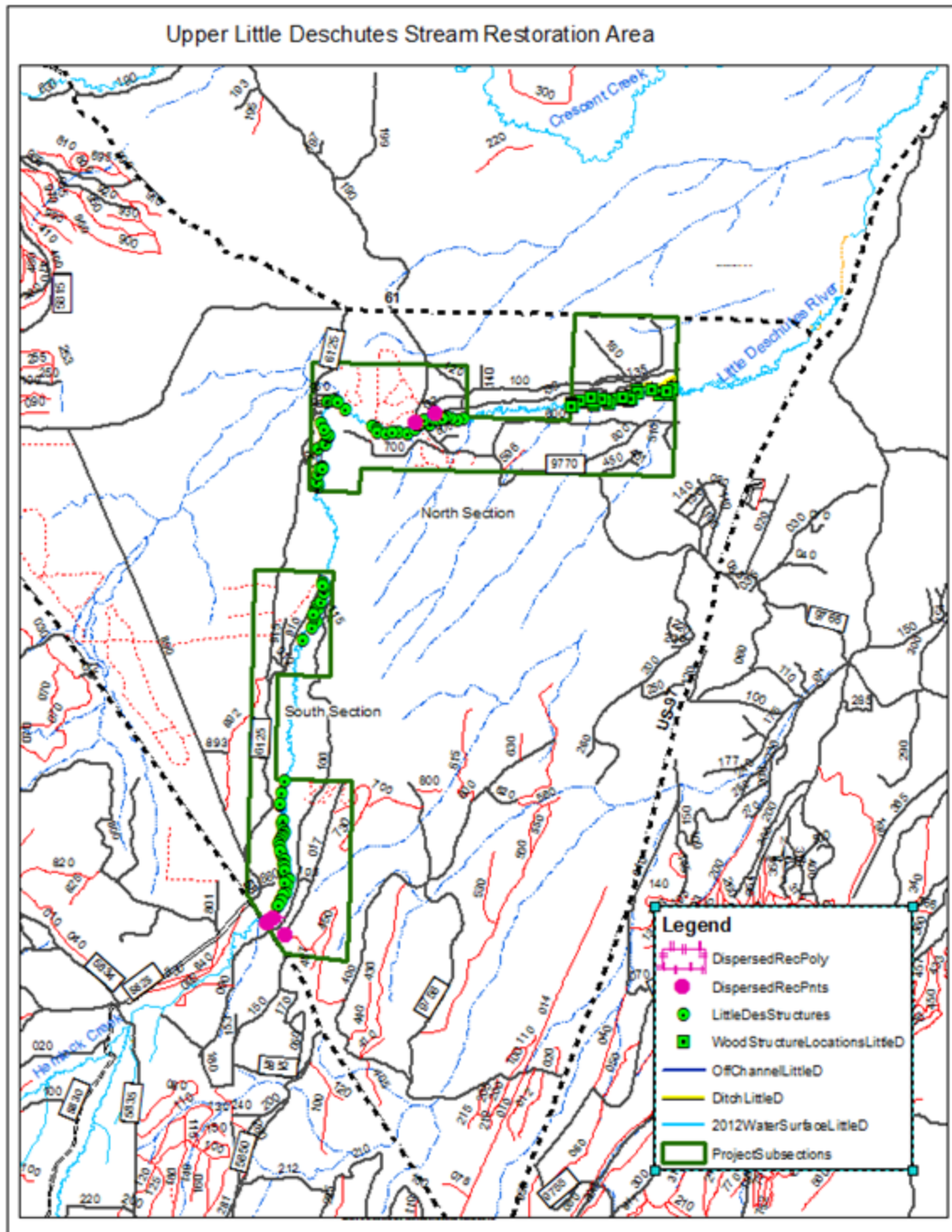
Management Guidance

Management of this project, as it relates to aquatic function, is directed by the Inland Native Fish Strategy (INFISH 1995), the Deschutes Land and Resource Management Plan (USFS 1990), the Clean Water Act (1972), 2010-2013 Deschutes and Ochoco Programmatic Biological Assessment and Executive Orders 11988, 11990, and 12088. Additional scientific guidance and background information is available within various watershed analyses and the National Best Management Practices for Water Quality Management (USFS 2012).

INFISH

RHCA standard widths are applied based on the category of stream, and watershed classification as defined by INFISH, pages A-5 and A-6. RHCA widths for this project are;

- Category 1 areas (fish-bearing streams) will consist of a riparian area that incorporates the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.



Map 1. Map of proposed restoration area along the Little Deschutes River

Riparian Management Objectives (RMOs) (page A-4 by INFISH), have been established to provide the criteria against which attainment or progress toward attainment of the riparian goals is measured. The interim RMOs provide the target toward which manager's aim as they conduct resource management activities across the landscape. It is

not expected that the objectives should be met instantaneously, but rather would be achieved over time. RMOs are in Table 1.

Table 2. Riparian Management Objectives (INFISH, 1995).

Habitat Feature	Interim Objectives
Pool Frequency	Varies by channel width (See below)
Water Temperatures	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period.) Maximum water temperatures below 59° F within adult holding habitat and below 48° F within spawning and rearing habitats.
Large Woody Debris (forested systems)	East of Cascade Crest in Oregon, Washington, Idaho, Nevada, and western Montana: >20 pieces/mile; >12" diameter; >35' length.
Bank Stability (non-forested systems)	>80 percent stable.
Lower Bank Angle (non-forested systems)	>75 per cent of banks with <90° angle (i.e., undercut).
Width/Depth Ratio	<10, mean wetted width divided by mean depth

Wetted width (feet)	10	20	25	50	75	100	125	150	200
Pools per mile	96	56	47	26	23	18	14	12	9

Standards and guidelines that pertain to water and this project, as established on page E-7 by INFISH are as follows;

- TM-1 – Prohibit timber harvest, including fuelwood cutting in RHCAs, except as summarized below.
 - Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions.
 - Apply silvicultural practices for RHCAs to acquire desired vegetation characteristics where needed to attain RMOs.

While harvest is not proposed within the RHCAs of Crescent Creek, thinning of encroachment is proposed to improve riparian vegetation within this area.

The Clean Water Act (1972) and Sections 319 and 303(d)

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of all waters to protect the Beneficial Uses as documented according to criteria by the Oregon Department of Environmental Quality (ODEQ). A beneficial use is a resource or activity that would be directly affected by a change in water quality or quantity. Beneficial uses are defined on a basin scale in the Oregon Administrative Rules for water quality and cover large areas of land. The

beneficial uses for this project are derived from the entire Deschutes Basin (approximately 6.9 million acres).

Under Section 319 of the 1987 CWA Amendments, states are required to determine those waters that will not meet the goals of the CWA, determine those non-point source activities that are contributing pollution, and develop a process on how to reduce such pollution to the “maximum extent practicable.” Section 303(d) of the CWA requires that a list be developed of all impaired or threatened waters within each state. The ODEQ is responsible for compiling the 303(d) list, assessing data, and submitting the 303(d) list to the Environmental Protection Agency (EPA) for federal approval.

Within or adjacent to the planning area the following waterbodies are on the 2010 303(d) list.

Little Deschutes River – listed for exceedances of stream temperature and D.O.

Executive Orders

The following Executive Orders pertain to this project;

- Executive Order 12088 requires Federal compliance with pollution control standards (i.e. the Clean Water Act).
- Executive Order 11988 requires agencies to avoid adverse impacts associated with the occupancy and modification of floodplains.
- Executive Order 11990 requires agencies to avoid adverse impacts associated with the destruction or modification of wetlands.

National Best Management Practices for Water Quality Management on National Forest System Lands (April 2012).

Guidance within this document that pertains to water resources and this project can be found below.

Joint Aquatic and Terrestrial Programmatic Biological Assessment (2010-2013)

Project Design Criteria (*these are not standards or guidelines*) for Oregon and Columbia Spotted Frogs calls for;

- No reduction in the amount of vegetative cover to the point of creating streambank instability. The minimum threshold is 90% stable streambanks.
- No measurable increase in stream temperature due to loss of shade.
- No alteration of flow regime that may lead to a measurable increase in stream temperature.

Best Management Practices (BMPs)

The Project Design Features in this document were developed to comply with the National Core BMPs. These core BMPs are meant to provide direction in the development of project specific practices such as the Project Design Features in this document. An extensive list of project applicable BMPs are included in the Hydrology Report on file. The following table summarizes the objectives of the National Core BMPs that are applicable to the Little Deschutes River Planning Area.

National Best Management Practices for Water Quality Management on National Forest System Lands (April, 2012).

Title	Activity	Objective
AqEco-1	Aquatic Ecosystem Improvement and Restoration Planning	Reestablish and retain ecological resilience of aquatic ecosystems and associated resources to achieve sustainability and provide a broad range of ecosystem services.
AqEco-2	Operations in Aquatic Ecosystems	Avoid, minimize, or mitigate adverse impacts to water quality when working in aquatic ecosystems.
		<p>Meet instream/floodplain large woody material needs through the falling of lodgepole pine encroachment within riparian areas.</p> <ul style="list-style-type: none"> • Use applicable practices of BMP Plan-2 (Project Planning and Analysis) and BMP Plan-3 (AMZ Planning) when planning operations in aquatic ecosystems. • Identify the aquatic and aquatic-dependent species that live in the waterbody, Aquatic Management Zone (AMZ), or on the floodplain and their life histories to determine protection strategies, such as timing of construction, sediment management, species relocation, and monitoring during construction. • Coordinate stream channel, shoreline, lake, pond, and wetland activities with appropriate State and Federal agencies. • Incorporate Clean Water Act (CWA) 404 permit requirements and other Federal, State, and local permits or requirements into the project design and plan. • Use suitable measures to protect the waterbody when preparing the site for construction or maintenance activities. • Clearly delineate the work zone. • Locate access and staging areas near the project site but outside of work area boundaries, AMZs, wetlands, and sensitive soil areas. • Refuel and service equipment only in designated staging areas (see BMP Road 10[Equipment Refueling and Servicing]). • Develop an erosion and sediment control plan to avoid or minimize downstream impacts using measures appropriate to the site and the proposed activity (see BMP Fac-2 [Facility Construction and Stormwater Control]). • Prepare for unexpected failures of erosion control measures. • Consider needs for solid waste disposal and worksite sanitation. • Consider using small, low ground pressure equipment, and hand labor where practicable. • Ensure all equipment operated in or adjacent to the waterbody is clean of aquatic invasive species, as well as oil and grease, and is well maintained. • Use vegetable oil or other biodegradable hydraulic oil for heavy equipment hydraulics wherever practicable when operating in or near water.

		<ul style="list-style-type: none"> • Schedule construction or maintenance operations in waterbodies to occur in the least critical periods to avoid or minimize adverse effects to sensitive aquatic and aquatic-dependent species that live in or near the waterbody. • Avoid scheduling instream work during the spawning or migration seasons of resident or migratory fish and other important life history phases of sensitive species that could be affected by the project. • Avoid scheduling instream work during periods that could be interrupted by high flows. • Consider the growing season and dormant season for vegetation when scheduling activities within or near the waterbody to minimize the period of time that the land would remain exposed, thereby reducing erosion risks and length of time when aesthetics are poor. • Use suitable measures to protect the waterbody when clearing the site. • Clearly delineate the geographic limits of the area to be cleared. • Use suitable drainage measures to improve the workability of wet sites. • Avoid or minimize unacceptable damage to existing vegetation, especially plants that are stabilizing the bank of the waterbody. • Use suitable measures to avoid or minimize impacts to the waterbody when implementing construction and maintenance activities. • Minimize heavy equipment entry into or crossing water as is practicable. • Conduct operations during dry periods. • Stage construction operations as needed to limit the extent of disturbed areas without installed stabilization measures. • Promptly install and appropriately maintain erosion control measures. • Promptly install and appropriately maintain spill prevention and containment measures. • Promptly rehabilitate or stabilize disturbed areas as needed following construction or maintenance activities. • Stockpile and protect topsoil for reuse in site revegetation. • Minimize bank and riparian area excavation during construction to the extent practicable. • Keep excavated materials out of the waterbody. • Use only clean, suitable materials that are free of toxins and invasive species for fill. • Properly compact fills to avoid or minimize erosion. • Balance cuts and fills to minimize disposal needs. • Remove all project debris from the waterbody in a manner that will cause the least disturbance. • Identify suitable areas offsite or away from waterbodies for disposal sites before beginning operations. • Contour site to disperse runoff, minimize erosion, stabilize slopes, and provide a favorable environment for plant growth.
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		<ul style="list-style-type: none"> • Use suitable species and establishment techniques to revegetate the site in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species. • Use suitable measures to divert or partition channelized flow around the site or to dewater the site as needed to the extent practicable. • Remove aquatic organisms from the construction area before dewatering and prevent organisms from returning to the site during construction. • Return clean flows to channel or waterbody downstream of the activity. • Restore flows to their natural stream course as soon as practicable after construction or before seasonal closures. • Inspect the work site at suitable regular intervals during and after construction or maintenance activities to check on quality of the work and materials and identify need for mid-project corrections. • Consider short- and long-term maintenance needs and unit capabilities when designing the project. • Develop a strategy for providing emergency maintenance when needed. • Include implementation and effectiveness monitoring to evaluate success of the project in meeting design objectives and avoiding or minimizing unacceptable impacts to water quality. • Consider long-term management of the site and nearby areas to promote project success. • Use suitable measures to limit human, vehicle, and livestock access to site as needed to allow for recovery of vegetation.
AqEco-3	Ponds and Wetlands	Design and implement pond and wetlands projects in a manner that increases the potential for success in meeting project objectives and avoids, minimizes, or mitigates adverse effects to soil, water quality and riparian resources.
		<ul style="list-style-type: none"> • Design the wetland project to create a biologically and hydrologically functional system. • Design for function, not form. • Keep the design simple and avoid over engineering. • Design the project for minimal maintenance needs. • Use natural energies, such as gravity flow, in the design. • Avoid use of hard engineering structures or the use of supplemental watering to support system hydrology. • Plan to allow wetland system time to develop after construction activities are complete. • Use wetland vegetation species and establishment methods suitable to the project site and objectives, consistent with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species. • Consider the timing of planting to achieve maximum survival, proposed benefit of each plant species, methods of planting, proposed use of mulch, potential soil amendment

		(organic material or fertilizer), and potential supplemental watering to help establish the plant community.
AqEco-4	Stream Channels and Shorelines	Design and implement stream channel and lake shoreline projects in a manner that increases the potential for success in meeting project objectives and avoids, minimizes or mitigates adverse effects to soil, water quality and riparian resources.
		<ul style="list-style-type: none"> • Determine design velocities appropriate to the site. • Limit maximum velocity to the velocity that is non-scouring on the least resistant streambed and bank material. • Choose vegetation appropriate to the site to provide streambank stabilization and protection adequate to achieve project objectives. • Use vegetation species and establishment methods suitable to the project site and objectives, consistent with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.
Rec-3	Dispersed Use Recreation	Avoid, minimize or mitigate adverse effects to soil, water quality, riparian resources by managing dispersed activities and underdeveloped sites to maintain ground cover, maintain soil quality, control runoff, and provide needed sanitary facilities to minimize the discharge of nonpoint source pollutants and maintain streambank and riparian area integrity.
		<ul style="list-style-type: none"> • Manage use to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources. • Develop and designate campsites in appropriate locations. • Limit group size and periods of use (numbers of consecutive days, time of day, etc.). • Consider providing primitive sanitation facilities in areas where perpetual concentrated dispersed recreation use is causing adverse effects to soil, water quality, or riparian resources (see BMP Fac-4 [Sanitation Systems]). • Close and rehabilitate dispersed or undeveloped sites that are causing unacceptable adverse effects on soil, water quality, and riparian resources (see BMP Fac-10 [Facility Site Reclamation]). • Manage site to mitigate adverse effects of use when closure is not practicable.
Rec-4	Motorized and Non-motorized Trails	Avoid, minimize or mitigate adverse effects to soil, water quality and riparian resources by controlling soil erosion, erosion of trail surface materials, and water quality problems originating from construction, maintenance and use of motorized and non-motorized trails.
Rec-5	Motorized Vehicle Use Areas	Avoid, minimize or mitigate adverse effects to soil, water quality and riparian resources at motorized vehicle use areas by managing activities to maintain ground cover, maintain soil quality, and to control runoff to minimize discharge of non-point source pollutants and maintain streambank and riparian area integrity.

		<ul style="list-style-type: none"> • Locate and maintain designated motor vehicle use areas to avoid or minimize adverse effects on soil, water quality, and riparian resources. • Clearly delineate and mark designated motor vehicle use areas in the field where practicable. • Close and rehabilitate designated motor vehicle use areas that are causing unacceptable adverse effects to soil, water quality, and riparian resources (see BMP Fac-10 [Facility Site Reclamation]).
Road-2	Road Location and Design	Locate and design roads to avoid, minimize or mitigate adverse effects to soil, water quality and riparian resources.
		<ul style="list-style-type: none"> • Locate roads as far from waterbodies as is practicable to achieve access objectives, with a minimum number of crossings and connections between the road and the waterbody. • Avoid sensitive areas such as riparian areas, wetlands, meadows, bogs, and fens, to the extent practicable. • Provide an AMZ of suitable width between the road and a waterbody to maintain desired conditions, goals, and objectives for structure, function, and processes of the AMZ and associated waterbody when a road must parallel a waterbody (See BMP Plan-3 [AMZ Planning]). • Relocate existing routes or segments that are causing, or have the potential to cause, adverse effects to soil, water quality, and riparian resources, to the extent practicable. • Obliterate the existing road or segment after the relocated section is completed (see BMP Road-6 [Road Storage and Decommissioning]). • Design a post-construction site vegetation plan, including short- and long-term objectives, using suitable species and establishment techniques to revegetate the site in compliance with local direction and requirements per FSM 2070 and FSM 2080 for vegetation ecology and prevention and control of invasive species.
Road-3	Road Construction and Reconstruction	Avoid or minimize adverse effects to soil, water quality and riparian resources from erosion, sediment and other pollutant delivery during road construction or reconstruction.
		<ul style="list-style-type: none"> • Construct pioneer roads using suitable measures to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources. • Confine construction of pioneer roads to the planned roadway limits unless otherwise specified. • Locate and construct pioneering roads to avoid or minimize undercutting of the designated final cut slope. • Avoid deposition of materials outside the designated roadway limits. • Use suitable crossing structures, or temporarily dewater live streams, where pioneer roads intersect streams. • Use suitable erosion and stormwater control measures as needed (see BMP Fac-2 [Facility Construction and Stormwater Control]).

		<ul style="list-style-type: none"> • Reconstruct existing roads to the degree necessary to provide adequate drainage and safety. • Avoid disturbing stable road surfaces. • Use suitable measures to avoid, to the extent practicable, or minimize direct discharges from road drainage structures to nearby waterbodies.
Road-6	Road Storage and Decommissioning	Avoid, minimize or mitigate adverse effects to soil, water quality and riparian resources by storing closed roads not needed for at least one year (Intermittent Stored Service) and decommissioning unneeded roads in a hydrologically stable manner to eliminate hydrologic connectivity, restore natural flow patterns and minimize soil erosion.
		<ul style="list-style-type: none"> • Establish effective ground cover on disturbed sites to avoid or minimize accelerated erosion and soil loss. • Evaluate all stream and waterbody crossings for potential for failure or diversion of flow if left without treatment. • Remove culverts, fill material, and other structures that present an unacceptable risk of failure or diversion. • Reshape the channel and streambanks at the crossing-site to pass expected flows without scouring or ponding, minimize potential for undercutting or slumping of streambanks, and maintain continuation of channel dimensions and longitudinal profile through the crossing site.
Road-10	Equipment Refueling and Servicing	Avoid or minimize adverse effects to soil, water quality and riparian resources from fuels, lubricants, cleaners and other harmful materials discharging into nearby surface waters or infiltrating through soils to contaminate groundwater resources during equipment refueling and servicing activities.
		<ul style="list-style-type: none"> • Allow temporary refueling and servicing only at approved locations, located well away from the AMZ, groundwater recharge areas, and waterbodies.
Veg-2	Erosion Prevention and Control	Avoid, minimize or mitigate adverse effects to soil, water quality and riparian resources by implementing measures to control surface erosion, gully formation, mass slope failure and resulting sediment movement before, during, and after mechanical vegetation treatments.
		<ul style="list-style-type: none"> • Operate equipment when soil compaction, displacement, erosion, and sediment runoff would be minimized.
Veg-3	Aquatic Management Zones	Avoid, minimize or mitigate adverse effects to soil, water quality and riparian resources when conducting mechanical vegetation treatment activities in the AMZ.
		<ul style="list-style-type: none"> • Use mechanical vegetation treatments in the AMZ only when suitable to achieve long-term AMZ-desired conditions and management objectives (see BMP Plan-3 [AMZ Planning]). • Adjust operations in the AMZ to avoid, minimize, or mitigate detrimental soil impacts where they are occurring.

Effects

Since the project area is within unoccupied habitat for either bull trout or redband trout, project activities would not directly impact ESA listed or Regionally Sensitive fish species. Bull trout have been extirpated from the Upper Little Deschutes River system.

The nearest redband trout can be found in Crescent Creek, whose confluence lies approximately 10 km downstream and below a mill pond and dam that likely poses a complete passage barrier.

It is anticipated that during implementation project activities would have the potential to affect fine sediment inputs, timing and duration of flow and shade values. The felling of trees, skidding and placement within the stream channel has the potential to displace fine soils and increase the probability of mobilization to surface waters. Fine sediment delivery to streams has been shown to adversely affect fish by abrasion of gill tissue, reduced ability to feed, decreased spawning success due to embedding the stream substrates and reducing oxygenation of those substrates. Based on personal experience in restoration work, it is common to have short duration increases in fine sediment delivery. Unless the inputs have a high level of clay, the visible sediment plume does not often travel downstream more than a kilometer. Bull trout and redband trout have been absent from the project area for several decades. Any pulse increases in sediment production are not expected to adversely affect listed fish species or their habitat.

The felling of lodgepole pine trees within the riparian area of the Little Deschutes River will likely result in a short term (less than five years) decrease in shading from the tree canopy. However, it is expected that as a result of project activities, there would be a long term increase in stream shading and a decrease in summer maximum stream temperatures. Increased long term shade is expected to occur as a result of improved soil moisture levels being able to support riparian vegetation in a broader area, and improved shading as a result of riparian planting and the degree of shading provided by riparian plants such as willow, aspen and sedge. Additionally, as a result of an elevated alluvial aquifer level, it is expected that there would be improved hyporheic exchange and therefore a greater degree of cooling due to groundwater inputs during summer months. This will likely also result in a greater degree of thermal and spatial heterogeneity in aquatic habitats. The anticipated short term reductions in shade provided by the removal lodgepole pine trees on the valley floor are not expected to have a measureable effect on water temperatures or adversely affect listed species or their habitats.

Management of user created trails, roads and dispersed recreation will likely reduce chronic fine sediment inputs and promote the reestablishment of riparian vegetation. These changes would be expected to improve water quality at a local scale and improve riparian function.

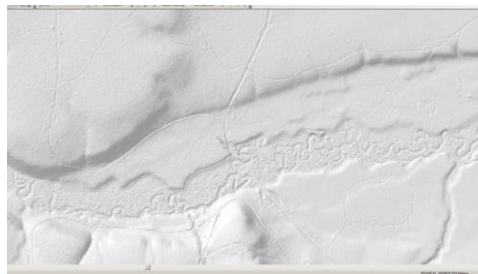


Figure 1. Hillshade image of LiDAR derived elevations along the Little Deschutes River within the planning area.

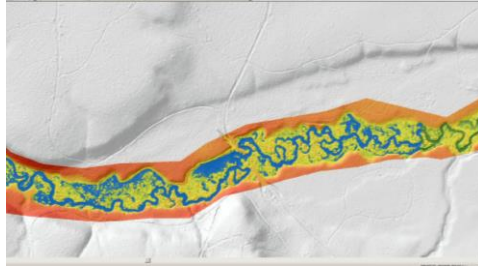


Figure 2. Detrended flow map of the same area shown in Figure 1, this map illustrates the anticipated water surface elevation or expected wetted area following project completion.

Effects Determination

There are no expected adverse effects to ESA listed species or regionally sensitive aquatics resource from this project for the following reasons;

- ESA listed fish species and regionally sensitive fish species are no longer found within the project area. High levels of non-native game fish have likely displaced these species from the Upper Little Deschutes River system upstream of Gilchrist.
- The nearest likely location occupied by Redband trout would be in the Little Deschutes River at the confluence with Crescent Creek (approximately 10 km downstream)
- The nearest occupied bull trout waters are in the Odell drainage which is more than 20 km away and in a separate twelfth field subwatershed.

Implementation of project activities would likely result in short term (less than two months) increased amounts of fine sediment delivery, and disturbance to riparian vegetation. The felling and placement of large wood along with the decommissioning of the illegal diversion ditch would likely result in increased amounts of fine sediment mobilization in the short term. Following project completion, it is anticipated that the shallow groundwater elevation would be elevated (as a result of large wood placement and displacement of water) which would support riparian vegetation growth and the colonization/stabilization of disturbed surfaces. It is anticipated that implementation of this project would improve shallow groundwater storage, and therefore improve hyporheic exchange and restoration of a more natural (pre-European American disturbance) flow regime for this area.

Overall this project would comply with guidance outlined in INFISH (1995), the Deschutes Land and Resource Management Plan (USFS 1990), the Clean Water Act (1972), the 2010-2013 Deschutes and Ochoco Programmatic Biological Assessment and Executive Orders 11988, 11990, and 12088.

References

USFS (USDA Forest Service). 1990. Land and Resource Management Plan, Deschutes National Forest. Bend, Oregon.

USFS (USDA Forest Service) and USDI Bureau of Land Management. 1995. Environmental Assessment, Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy (INFISH).

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